

# EMSC Connects

Volume 5, Issue 12

December 2016

## Emergency Medical Services for Children

### Special points of interest:

- Croup and bronchiolitis examined
- Capnography and the pediatric patient
- Respiratory stats
- Happenings in EMSC

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### A Word From Our Program Manager

T'was the night before the holiday and all through the land  
The EMTs and paramedics were ready to give a helping hand.  
They were prepared to respond to every child's need  
And ready to do so with great speed.

With the Braslow tape firmly in their grip  
They measure and determine how much medicine to drip.  
The pulse, respirations and blood pressure will see  
If the child needs more care from the nurse and M.D.

They will stop the bleeding and will give oxygen too  
To ensure the child stays a healthy pink, not turn blue.  
After they assess, treat and keep the child warm  
They bundle them up to cause no further harm.

Like Santa and his sleigh, they make off into the night  
With the sirens roaring and a flash of red light.  
As they make their way to the hospital door,  
They continue to monitor, assess and do more.

So, on this cold wintery eve in December  
Please take some time to say thanks and remember,  
When the EMS healthcare team respond and prepare,  
They give every child the very best care.

To the prehospital and hospital healthcare providers:  
Whatever is beautiful,  
Whatever is meaningful,  
Whatever brings you happiness...  
May it be yours this Holiday Season  
and throughout the coming year!  
Seasons Greetings, continued blessings, and thank you  
for your dedicated service to the children of Utah.

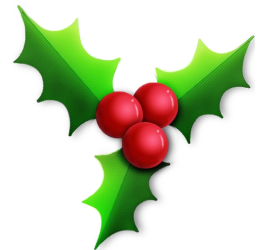
*Jolene Whitney*  
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### Pedi Points

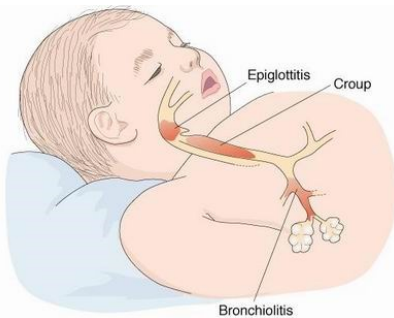
**Tia Dalrymple RN, BSN**

We wouldn't be a pediatric resource without a discussion of respiratory issues in the winter. This complaint makes up the largest number of Patient Care Reports for EMS in the pediatric population.

**Case A:** A 2 week old infant with a history of noisy breathing, cough and respiratory distress for several hours with occasional apnea. He was full term and seemed to be doing well since birth, but parents report a 2 day history of poor feeding. He is tachypneic and tired appearing. Vital signs: T 37.4, P 177, R 60, BP 90/60, oxygen saturation is 86% on room air.



## Pedi Points –continued



**Case B:** A 2 year old female with a chief complaint of coughing and fever for 3 days. She is alert and is drooling. She has moderate retractions and appears tired. She was previously healthy. Vitals: T 38.3, P 100, R 26, BP 100/73, oxygen saturation 97% on room air.

Two children. Do you know which has croup and which has bronchiolitis? You may be able to guess, but do you know the difference between the two? What are the signs and symptoms of each? What symptoms signal danger? How would you treat these children?

### The Doc Spot

**Howard Corneli MD**

Attending Physician, Primary Children's Hospital (PCH) Emergency Department  
Professor of Pediatrics, University of Utah

**80% of cardiopulmonary arrests in children have a respiratory origin. Two of the most commonly seen respiratory diseases in the pediatric population are croup and bronchiolitis**

### Viral Croup

- 2/3 of all croup (laryngotracheobronchitis)
- A history of cold, congestion, and then a barking cough
- Often fever; which may be high
- More seasonal (November peak)
- This type only reoccurs in 5% of cases

### Recurrent Croup

- 1/3 of all croup (spasmodic croup)
- Little history of viral symptoms or fever
- Sudden onset at night
- Less seasonal, more recurrent

### “Croup Hunting” - Croup Recognition

- \* Some cases are obvious with that barking cough
- \* Some parents know croup (some don't)
  - \* They may report stridor as a “wheeze” or “noisy breathing”
- \* First responders may hear more stridor on initial assessment
  - \* Good documentation and reporting can aid in diagnosis
- \* Seasonal occurrence (November peak) or sporadic
- \* Onset or increase of distress may be sudden
- \* Rapid waning of symptoms is also a clue
- \* Is her voice or cry hoarse or scratchy?
  - \* Elicit cry or trigger cough



Hypoxia usually means lower airway involvement. If the patient is hypoxic. You may be dealing with more than simple croup.

### A Teaching Pearl - Hypoxia in Croup

Hypoxia usually means lower airway involvement. Only severe upper airway obstruction causes hypoxia. This means normal oximetry is not necessarily reassuring in croup. Croup patients may also have asthma which affects their lower airway, so abnormal oximetry needs clinical correlation.

## The Doc Spot –continued

### Transport Tips

- It's especially helpful to keep patient calm
- Keep with parent if at all possible
- Patients usually prefer to sit up
- Give Decadron (and ibuprofen) at outset
- Cool Mist may be used if available\*
- Cool night air environment is helpful

\*Mist may not be primarily effective, but does allow time for calming down. We find it helpful for this purpose.



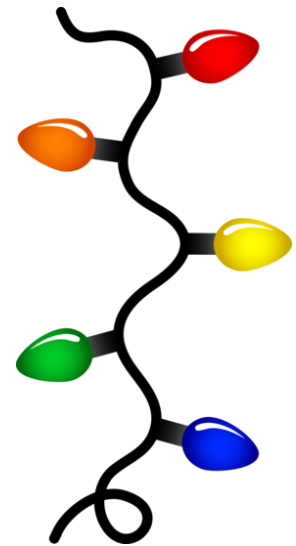
### Racemic epinephrine

- 0.5 cc/kg of 1:1,000 epinephrine (max 5 cc) via nebulizer
- Treatment lasts 2-3 hrs; disease lasts 2-3 days
- Use of epinephrine requires a minimum of 3 hour ER observation
- Avoid for mild, stable, or improving cases\*
- If used, don't aggravate the patient

\*Indications for Epi: Moderate to severe distress not relieved by calming and pain control.

### Dexamethasone (In the Emergency Department)

- 0.6–1 mg/kg
- Oral works as well as IM
- Onset < 4 hours
- Useful to give as early as possible



### Parting Shots

- Intubation for Croup? It is often difficult and it may cause post-negative-pressure pulmonary edema. Avoid it if at all possible. If needed, prepare as a difficult airway and preoxygenate. Prepare tubes in several sizes and lubricate well. Be wary of supraglottic or subglottic obstruction.
- Don't forget the Heliox (70:30 mixture of Helium and Oxygen). Studies have shown that Racemic Epinephrine and Heliox were equally effective treatments for croup (Weber et al. Pediatrics 2001;107(6):E96) and studies are looking at transporting with Heliox. (DiCecco, Rega: Air Med J. 2004;23:33-5)

## Pedi Points –continued

**Tia Dalrymple RN, BSN**

**Trauma Charge Nurse, PCH Emergency Department**

Bronchiolitis is an inflammation of the bronchioles, usually the result of a viral illness. Respiratory Syncytial Virus (RSV) is the most common viral cause. In fact, many providers and parents may use "RSV" as a nickname for bronchiolitis, but there are many other pathogens that can cause the infection including parainfluenza, adenovirus, and rhinovirus.

### Bronchiolitis

- Most often in children, 0 to 24 months
- One of the few viral infections that can cause serious illness in newborns.
- Incidence is approximately 2.2 per 100 children annually.

# RSV

Respiratory Syncytial Virus (RSV) is the most common viral cause of bronchiolitis, many parents and providers use the terms interchangeably, but RSV is not the only cause of bronchiolitis

## Expert Input –continued

### Symptoms

- Nasal secretions (lots)
- 1-4 day history of congestion with a low-grade fever
- Parents of infants will often report poor feeding, lethargy or agitation
- Breathing problems, including wheezing, retractions, and a “noisy” cough

### Treatment

- Most treatments for bronchiolitis are unproved, leading to inconsistent treatment strategies
- It all boils down to supportive care
  - \* Ensuring adequate hydration and oxygenation
  - \* Careful monitoring for complications
- Our first line treatment in the ED is naso-pharyngeal (nose and throat) suctioning.
  - \* Thorough suctioning can greatly improve distress (often no other treatment is needed). Many pre-hospital providers are reluctant to perform naso-pharyngeal suctioning, but it can be your greatest weapon against bronchiolitis.
    - Blub suctioning is a good tool.
    - To go deeper an 8Fr suction catheter will work well on most pediatric patients, but if secretions are thick and the nares are large enough, a 10Fr works better. Measure the distance from the tip of the nose to the ear lobe then insert the catheter into the airway to your measured point. Apply suction as you remove the catheter. Try to keep the treatment under 10-15 seconds and let the child catch his breath between attempts. If the child has thick secretions you can use a NS solution to soften things up (0.5mls in neonates to 2mls for older children). Observe the child's respiratory rate and quality, color, heart rate, and SaO2 throughout the treatment.
- If the child is hypoxic even after suctioning, give oxygen to keep saturations greater than 94%. Hint:: infants tolerate a nasal cannula very well and it's easier than chasing them with blow by.
- Albuterol
  - Effectiveness of bronchodilators in bronchiolitis is unproven. Our ED's current practice is to trial one nebulized albuterol treatment (2.5mg). If there is no improvement the albuterol is discontinued.
- If patient continues with severe distress, intermittent apnea, or apparent respiratory failure we will implement high-flow, positive pressure ventilation, or endotracheal intubation.

Wright R, Pomerantz W, and Luria J. New Approaches to Respiratory Infections in Children. Pediatric Emergency Medicine 2002, 0733-8627

**Croup and bronchiolitis are common ailments in the pediatric population. Most patients will recover quickly but as pre-hospital providers you will see the sickest of the sick. Case A our bronchiolitis baby, will be best served with deep suctioning and supportive oxygen therapy. Case B has croup and she will need dexamethasone and close monitoring, if she does not improve we will use racemic epinephrine. Knowing how to distinguish which illness you are dealing with, as well treatment options, will prepare your team for that pediatric respiratory call.**



Image source: Inputsecpr.com

## From the Field Ryan Kirkman EMT-I

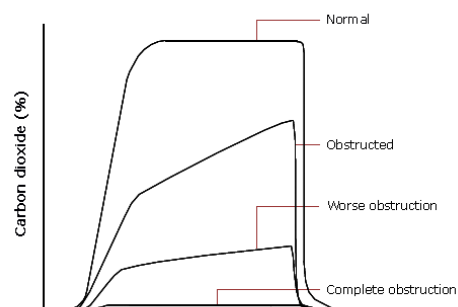
### Capnography Use in the Pre-hospital Pediatric Patient

Capnography use in the adult and pediatric patient has become a gold standard for endotracheal intubation monitoring; and is rapidly becoming a standard of care in all adult patients suffering from respiratory distress. To review the range of values for end tidal carbon dioxide (ETCO2), 35-45 mmHg is the normal range, with 40 mmHg being optimal. There was some disagreement about the use of routine capnography in pediatric patients due to inconsistencies in the research data from earlier versions of equipment. The current versions of capnography tools offer a much more accurate assessment of ETCO2. The updated instruments offer active sampling by taking a sample of expired air from the patient through a tube into the machine for real time readings.

## From the Field -continued

The routine use of non-invasive capnography in the pediatric respiratory patient is a valuable tool and one that is significantly under used in the pre-hospital setting. The real time ETCO<sub>2</sub> numbers provide an immediate assessment tool for the respiratory status of the patient. For instance, the provider treating a pediatric patient with a respiratory illness and ETCO<sub>2</sub> reading of less than 35 mmHg knows the patient is over breathing normal compensation mechanisms and is in real trouble. On the other side, the same patient with a reading of over 45 mmHg is hypoventilating and retaining CO<sub>2</sub>. The provider in the latter situation now has a real time assessment tool to manage ventilation support in an attempt to bring the value below 45, and back into normal range.

The wave forms can also be a useful assessment tool; a normal box like tracing can have a number of different patterns depending on the underlying disease process. In the asthmatic patient the tracing tends to take on a shark fin appearance indicating the patient has a rapid inspiratory phase and a longer than normal expiratory phase, which is indicative of an acute asthma exacerbation. The more serious wave form seen is the dislodged endotracheal tube. The real time wave form of capnography would show an immediate flat line appearance indicating the tube is no longer in the trachea.



Capnography wave form can be a useful assessment tool

End tidal carbon dioxide monitoring has come a long way since its birth, and has developed into a very useful, very accurate assessment and monitoring tool. Providers who work in agencies that do not have ETCO<sub>2</sub> capabilities should encourage the implementation of such tools and protocols. The value of the information obtained from an adequately trained provider is invaluable to the proper treatment of the pediatric patient suffering from a respiratory emergency.

## Prevention Pearls

Be sure to wear your PPE (personal protective equipment, it's part of scene safety.

As healthcare providers we are the first line defense in this battle against the spread of infection. Unfortunately we are also at risk from exposure to these pathogens. You cannot serve the children of our state before first protecting yourself. The comforting thing is that the basic practices that protect you from the common cold are the same that will protect from any unknown or aggressive infection we may encounter in the future. First arm yourself with knowledge and refresh the basics and you will come through this season just fine.



**Infection Prevention and You**

**You are an important part of infection prevention!**

- Wash your hands with soap and water or use hand sanitizer often. Ask healthcare workers and your visitors to do the same.
- If you are having surgery, ask if you should shower with a germ-killing soap ahead of time.
- Take medications as directed.
- Ask about safe injection practices. Remember: One Needle, One Syringe, only One Time.
- Every day, ask if you also need your catheter.
- Speak up for your care!
- Clean your hands and make sure everyone around you does too.
- Sneeze and cough into your elbow, not your hand.
- If your room looks dirty, ask to have it cleaned.

**Who are infection preventionists?**

Infection preventionists use their detective skills to find the best ways to make sure everyone is doing the right things to keep you safe.

- Catheters or other devices will be placed in your body, often your skin. Infection preventionists will help you stay safe.
- Your healthcare provider will wear gloves, gowns, and masks all the time. If you are in contact, ask and make sure they wear the right gear.
- Healthcare workers will cover their nose and mouth when they are sick.
- Your room will get regularly cleaned to keep it safe for you.

**What are healthcare-associated infections?**

Healthcare-associated infections are a result of germs entering your body during medical care.

- Catheter-associated urinary tract infections: When germs travel down a urine catheter and cause an infection in your bladder or kidneys.
- Respirator infections: When germs enter the lungs by way of a ventilator or tube that is placed in your airway.
- Surgical site infections: An infection that happens about surgery in the part of the body where the surgery took place.
- Central line infections: An infection of the lungs.

APIC  
American Professional Society on the Infection Control in Healthcare

Learn more: [www.apic.org/InfectionPreventionAndYou](http://www.apic.org/InfectionPreventionAndYou) | [www.facebook.com/APICInfectionPreventionAndYou](https://www.facebook.com/APICInfectionPreventionAndYou) | [twitter.com/apic](https://twitter.com/apic)

# December 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 PGR	2 Wayne Co PEPP →	3
4	5	6	7	8 PGR	9	10
11	12	13	14	15 PEL PGR	16	17
18	19	20	21	22 PGR	23	24 
25 	26	27	28	29 PGR	30	31

## Pediatric Education Around the State

**Pediatric Grand Rounds (PGR)** are educational/CME offerings webcast weekly (Sept-May) you can watch live or archived presentations. It is geared towards hospital personnel. But will qualify for BEMSP CME Access at <https://intermountainhealthcare.org/locations/primary-childrens-hospital/for-referring-physicians/pediatric-grand-rounds/>

**Peds EMS Lecture Series (PEL)** Free monthly pediatric CME/CEU presentations from Primary Children's Emergency Department Attending Physicians to Utah's EMS. Offered every 3rd Thursday (except this month). Contact [Lynsey.Cooper@imail.org](mailto:Lynsey.Cooper@imail.org) for info

**Trauma Grand Rounds (TGR)** This free offering alternates with EMS Grand Rounds every other month, it is geared towards hospital personnel.

### There are 3 ways to participate

- Attend in person 0700-0800 Classroom A SOM University Hospital.
- Attend live via the internet at : <http://utn.org/live/trauma/> To receive CME for viewing via live stream, please send an email with your name and the presentation you viewed to [zachery.robinson@hsc.utah.edu](mailto:zachery.robinson@hsc.utah.edu). A CME certificate will be emailed to you within two weeks.

- View the archived presentation two weeks after the live date. at [www.healthcare.utah.edu/trauma](http://www.healthcare.utah.edu/trauma)

**Project ECHO Burn and Soft Tissue Injury (ECHO)** has a pediatric and adult component. CME/CEU and MD CME available <https://crisisstandardsofcare.utah.edu> click request access and follow instructions.

## Upcoming Peds Classes, 2016

For PEPP and PALS classes throughout the state contact Andy Ostler [Aostler@utah.gov](mailto:Aostler@utah.gov)

For PALS and ENPC classes in Filmore, Delta and MVH contact Kris Shields at [shields57@gmail.com](mailto:shields57@gmail.com)



## Emergency Medical Services For Children

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We're on the web

<http://health.utah.gov/ems/emsc/>  
and on Twitter EMSC Utah

The Emergency Medical Services for Children (EMSC) Program aims to ensure that emergency medical care for the ill and injured child or adolescent is well integrated into an emergency medical service system. We work to ensure that the system is backed by optimal resources and that the entire spectrum of emergency services (prevention, acute care, and rehabilitation) is provided to children and adolescents, no matter where they live, attend school or travel.

## Happenings: Win Star Wars tickets and promote safety at the same time!

Zero Fatalities is asking the public to submit [buckle up photos](#) for a chance to win Star Wars Tickets (Dec 17, 6:30pm at Jordan Commons Megaplex). This is similar to the contest Zero Fatalities hosted last year. We would love for you to participate and encourage others to do the same. Winners will be selected randomly over the next three weeks. So submit today for the best chance of winning. Submit photos [here](#) before December 6. If you have any questions, call/email/text Allyse Christensen [achristensen@pennapowers.com](mailto:achristensen@pennapowers.com)).

